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ABSTRACT

A telephone survey was administered to colleges and universities with an approved science teacher education program in the state of Ohio to determine the status and to estimate the use of interactive video technology (IVD) in preservice science education programs. The following characteristics were examined: (1) overall IVD usage; (2) classroom demographics; (3) faculty demographics; (4) various uses of IVD in the programs surveyed; (5) IVD particulars; (6) hardware, video disk, and software components; (7) outcome studies; (8) inservice workshops; and (9) information regarding institutions not using IVDs. The data indicated that there is an emerging nature of IVD use in science teacher education programs in Ohio. (ZWH)

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A SURVEY OF INTERACTIVE VIDEO USE IN SCIENCE TEACHER EDUCATION IN OHIO

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Introduction

The emergence of interactive videodisc (IVD) technology has provided preservice education programs with an alternate means to study factors influencing teaching and learning. Goldman and Barron (1990) found that IVD-based preservice training boosted the teachers' confidence in teaching. Vitale and Romance (1992) reported an experimental study in which preservice science teachers who used IVDs in an elementary methods course significantly gained in their science knowledge and showed a more positive attitude toward science teaching than those who did not use IVDs. According to Goldman and Barron (1990), methods courses can be "revised to help beginning teachers relate theory to practice" (p. 22). According to Pollard (1992), "the increased supply of interactive videodisc programs, coupled with the push to integrate technology within the public school curriculum, compels the educational community to examine the components and effects of interactive videodisc technology" (p. 189). However, there is no estimate to date of the status and

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role of interactive videodiscs being used in preservice science teacher education (Grandgenett, et al., 1992).

Purpose

As a preliminary step in attempting to determine the status and to estimate the use of interactive video technology in preservice science education programs in the U.S., a telephone survey of science teacher education programs in the State of Ohio was undertaken. The study sought answers to the following questions:

1. How many colleges and universities in the State of Ohio use IVDs in their preservice science education programs?
2. What are the demographics of preservice science classrooms using IVDs?
3. What are the demographics of preservice science teachers in IVD classrooms?
4. What is the purpose of using IVD in preservice science education?
5. What are the particulars of existing IVDs in preservice science education?
6. What are the software and hardware components of the IVDs in preservice science education?
7. Are there any outcome studies available on IVD usage in preservice science education?
8. What is the status of IVD usage in inservice science education?
9. What are the reasons for not using IVDs in preservice science education?

Procedure

The study employed a telephone survey to address the research questions raised. A consideration of the questions raised in this study and discussion of the study objectives with colleagues in science and technology

education led to the development of the Preservice IVD Use Telephone Survey Questionnaire.

A list of colleges and universities in the state of Ohio approved for preservice teacher education was prepared from the Ohio Educational Directory (1991-92). The survey lasted over a period of approximately three months beginning December 1992, and collected responses from 47 institutions (11 public, 36 private) in the state of Ohio.

Results and Discussion

Overall, the survey found an encouraging picture of interactive video use in preservice science education in Ohio. The results are presented and discussed as follows.

1. Overall IVD Usage

Of the 47 institutions responding, 18 (38.9% public and 61.1% private) use IVDs in preservice teacher education. Fourteen institutions currently use IVDs and four are in the process of implementing IVDs.

2. Classroom Demographics

Of the 14 institutions currently using IVDs, six use it for both graduate and undergraduate programs, and eight use it for undergraduate only.

The average class size of those using IVD is about 32 students, and the students' average age is 24.5 years.

The male to female ratio of students is 3 to 7. IVDs have been mainly targeted at the elementary level (73.3%).

3. Faculty Demographics

The ranks of faculty members using IVDs in their science methods classes range from Instructors (5.9%), Assistant Professors (29.4%), Associate Professors (29.4%) to Full Professors (35.3%). The faculty gender ratio is 56% males to 44% females.

4. Purpose

Of the 14 institutions using IVDs, 92.9% are using them for teaching instructional strategies, 7.1% for teaching critical thinking skills, 7.1% for

teaching management strategies and 28.6% for teaching content. (Total greater than 100% due to multiple uses.)

Of the 15 institutions employing IVD, 92.9% offer science methods courses and 7.1% offer general methods courses. About 78.6% of IVD use is part of methods classes and 21.4% for separate classes (computer based tools, astronomy/physics, instructional media).

5. IVD Particulars

Of the IVDs in use, 42.9% are custom developed while 71.4% are purchased from vendors.

Of responses from 13 institutions, the percent use of IVD per day per class time is 12.2 (about 6.1 minutes/50 minute class period). Due to lack of any research on the relationship between the amount of time in IVD use and student achievement/performance it would be difficult to interpret this result at this point. Further studies are needed to clarify this relationship.

Based on responses from 13 institutions, IVDs have been in use for an average of 2.2 years with an average of 2.8 stations per institution. Considering that IVD is a relatively new technology, it is encouraging to see that it has been in use in science teacher education for over two years.

Among the IVDs in use, 42.9% are Level I, 14.3% Level II and 78.6% Level III. (In Level III IVD systems the video disk is fully controlled through an external personal computer). (Total greater than 100% due to multiple uses.)

6. Components

Of the hardware components, 78.6% of the computers in IVD systems are Macintosh followed by 14.3% Apple and 14.3% IBM. (Total greater than 100% due to multiple uses.) Pioneer accounts for 85.6% of the video players in IVD systems in use..

Of the video disk components, 14.3% of the video disks are custom developed as opposed to 100% purchased from a vendor. (Total greater than 100% due to multiple uses.)

Of the software components, 85.7% are HyperCard, 7.1% HyperStudio, 7.1% LinkWay and 7.1% SuperCard. (One respondent was uncertain.)

Average cost of obtaining an IVD systems per institution as reported by eight institutions is $11,206.

From the responses of 12 institutions it was estimated that in 50% of the cases purchase of IVDs for preservice science teacher education was made possible through external grants and in the rest of the cases through department, college and other funds.

7. Outcome Studies

None of the institutions surveyed has available any outcome studies on IVD use in preservice science teacher education.

8. Inservice Workshops

Workshops in IVD use have been offered by 28.5% of the institutions for inservice teachers and by 21.4% of the institutions for their own faculty members. The average number of workshops per institution is 11. Of the workshops conducted for inservice teachers, 75% were for elementary teachers, 75% for middle school teachers and 25% for high school teachers. (Total greater than 100% due to multiple responses.)

9. Not Using IVDs

Twenty-nine (61.7%) institutions do not use IVDs in their preservice science teacher education programs. Of these institutions, 75.8% offer science methods courses, 13.7% offer general methods courses and 10.3% offer no methods courses at all.

Lack of finances and equipment were the predominant reasons for not using IVDs in preservice science education, followed by lack of interest, time, knowledge and familiarity.

Implications

The data from this study clearly indicate the emerging nature of IVD use in science teacher education. If we are to make informed use of this technology it is apparent that more information is needed in several areas.

This survey showed that, within Ohio, IVD use has been mainly at the elementary education level. Is this pattern widespread? Does it reflect the

status to be found on a national basis? What are the causes that result in more IVD use in elementary education programs? Or, conversely, what are the causes of lower use in secondary education programs? What might contribute to greater use in teacher education for secondary science?

Do the observed patterns of nearly equal IVD use by all ranks of faculty members and no apparent gender difference in use reflect national patterns? What kind of training have faculty members had that led to these results? Might there be some factors that could be applied to other aspects of science teacher education in our attempts to encourage girls and young women, as well as minorities, to pursue careers in science?

Currently, IVD use as reported in this survey is concentrated on teaching instructional strategies. It would seem that, given the excellent simulation capabilities of IVD, its use in examining classroom management techniques should be thoroughly explored. Similarly, IVD's potential in presenting life-like problems would argue the case for greatly expanding its use in teaching critical thinking and problem solving skills. What techniques, such as anchored instruction, might be effectively employed with IVD use?

The paucity of data related to outcomes of IVD use points up the need for further study. What relationships exist between IVD use and student achievement? Between IVD use and student performance? Do preservice science education students' perceptions of themselves and their capabilities change? In what ways?

This powerful and flexible technology holds great potential promise. But, if science teachers are to capitalize on technology as an aid to increased professionalism there is much yet to learn about IVD, its use, and its effects.

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